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PARASITIC ARTHROPODS UNDER ANTHROPOPRESSURE

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Civilization advancements principally destroy biological life. Under the effect of anthropopressure not only separate species, but entire biological systems, including host-parasite systems, vanish. The unilateral activity of man involuntarily and often unconsciously involves quite unexpected results.

Anthropopressure manifests itself in the following aspects: urbanization, industrialization, application of chemicals to the environment, misuse of medicines and stimulants, melioration of the soil, mass — not organized — tourism, covering roads and water basins with concrete and so on. All this results in the devastation of nature, involving interference in the biological balance of ecosystems expressed as their impoverishment or an excess eutrophization (e.g. as a results of mineral fertilization), which in consequence become dangerous to the environment. Here mention should also be made of the discharge of warm water wastes into natural water basins, which, as may be expected, accelerates the development of many species of amphibious arthropods and among them — mosquitoes.

In a sense, a manifestation of anthropopressure is the breeding of domestic animals in large herds, which in the case of pigs favours the development of parasitic epizooties, such as, e. g. pig mange (Kamyszek, 1975), difficult to control.

Below I wish to point out some problems, associated with anthropopressure.

The Pharaoh's ant, having been recorded in the Polish territory since 1892, never previously had such comfortable conditions for existence as it now has in modern apartment buildings. Large complexes of apartment house, connected to a boilerhouse by tubes, create ideal conditions for

the development of this sanitary pest. This has become the subject of wider interest as an insect, creating serious sanitary dangers, particularly in some regions of the country.

Wiśniewski in his paper of 1971 gives 21 stands of this species in Poland, distributed in the area of Silesia, Gdańsk, Gdynia, and six other localities. Wengris in his report "The history of the spread of *Monomorium pharaonis* L. in Poland" delivered at the Symposium devoted to the Pharaoh's ant in 1975 already gives 33 stands of this pest. This year the pest under discussion has been found by Wiśniewski for the first time in Poznań.

An apparently stone biological desert of densely built up towns conceals very specific sings of life. Local climate of towns (mezoclimate) which is usually warmer than the surrounding microclimate, and has a smaller range of thermal oscillations, favours the development of heat-loving species including some parasites. Many parasitic species find ideal conditions for hibernation. Recently Polish newspapers informed of a mosquito plague in Warsaw (in Żoliborz) in spite of a dry summer and other conditions, which usually do not favour the development of mosquitoes.

Insect infestations were also recorded in Budapest by Herczeg, Vamos, Gaab and Salfay.

The next problem is the so-called mite allergy, induced by allergens present in house dust with mite exuviae and excreta. Allergens were found, e. g. in *Dermatophagoides pteronyssinus* (Trt) and in *D. farinae* Hughes, the latter species occurring in Poland (Boczek, 1972). Chmielewski (1975) gives 8 allergogenic species, but more species of mites and insects accompanying man are likely to induce hypersensitivity. The problem of allergic diseases induced by arthropods is not yet so dangerous in Poland, as it is in the USA, where anthropopressure into biological life is much stronger. As reported by Arnold Brody (1971), on the average, 5% of children in the USA are sensitive to house dust. The main reason for increasing allergic diseases is, perhaps, mass damage of the mucous membranes of nose and lungs by industrial dust, which facilitates contact between allergens and immunoglobulins.

As mentioned, warm water wastes, such as e. g. in the lakes of Zagłębie Konińskie (K.O.P.), according to the general ecological law, should accelerate the development of species of amphibious insects living there and thus increase the number of generations and the size of populations. This rule has been partially confirmed. As follows from the studies by Madziarowa (1975 — a typescript) on *Chironomidae* in several Konińskie Lakes, the development of the species mentioned has, in fact, been accelerated, but the number of generations has not increased. It seems that genetic record is more stable than modified environmental factors. We do

not, however, know what will be the relations in several years. It would seem that mosquitoes, are subjected to the same laws, but in reality this problem looks completely different. In three warmed-up lakes (Państwskie, Wąsowsko-Mikorzyńskie and Ślesińskie) mosquitoes do not occur at all, whereas in the near by lake Bnińskie, with the water not warmed up, the development of mosquitoes proceeds normally. So, their development is presumably inhibited by too high a temperature, which causes no harm to *Chironomidae*. It should be mentioned here that the oxygen level reached or exceeded full saturation. However, the behaviour of the species; variations of the family studied was different from that under natural conditions in larva populations of warmed up lakes are indicative of an obvious summer peak, whereas the control lake (Bnińskie) has two peaks — summer and autumn. Spring and summer-autumn emergences, as a result of acceleration, occurred about two weeks earlier. The number of generations, however, as mentioned before, does not increase. During autumn with maximum temperatures (27-28.5°C) the development and emergence of larvae were not slowed down.

Results of anthropopressure cannot be foreseen. On the basis of certain common ecological rules we can only suggest directions of population changes. For example, according to Thienemann's rule, the more degraded the biocenosis, the more evident the domination of some species in ecosystems. This is confirmed by gradation of harmful insects or by domination of specific species of soil mites living in soil contaminated by industrial wastes. As shown by Seniczak (1975), the rate and direction of habitat degradation may be indicated as a degree of domination of some mite species.

As also follows from preliminary studies, conducted by Sokołowski (1976 — a typescript) in the area of stands located near Azoty Puławskie — an environment seriously degraded by industrial exhalations, where biological life is almost completely dying off, ants from the group *Formica rufa*, being the dominant over the remains of the vanishing fauna until the stand is removed, are reproducing without any difficulty.

This phenomenon can be transferred to the world of a human and animal parasites. It can never be excluded that certain kinds of anthropopressure induce mass development of parasitic species or sanitary pests.

A potential danger is also associated with mass tourism, which causes specific interference in ecosystems. An excessive density of tourists, especially in areas deprived of sanitary facilities, creates convenient conditions for the development of some parasitic arthropods and pathogenic microorganisms.

In connection with the above, I consider it would be advantageous to maintain constant control over parasite populations and to determine foci

of parasitic insect and mite occurrence in the wake of geomedical atlases of epidemic diseases, conducted since 1940 all over the world. In Polish literature dealing with the subject there are sometimes fragments concerning the occurrence foci of parasitic insects and mites. Studies of such foci may be used for the control of their prevalence in relation to anthropopressure and for the preparation of maps of areas particularly threatened by parasites and sanitary pests; these maps could be also used to organise recreation and tourism.

Under conditions of anthropopressure there is a permanent threat from parasites and other pathogens, and this may be prevented only by control and prophylaxis, if the rules of hygiene are carefully followed.

The importance of this problem, as well as modest data on this subject, require co-ordinated complex studies. The valuable initiative of organizing the present Symposium is an expression of this.

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STAWONOGI PASOŻYTNICZE W WARUNKACH ANTROPOPRESJI

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Antropopresja przejawia się m. in. w urbanizacji, industrializacji, chemizacji, melioracji, masowej turystyce, wielkostadnej hodowli zwierząt i innych. Skutki antropopresji manifestują się w różnych, bardzo niekorzystnych dla zdrowia zjawiskach, z których wymienimy kilka.

Nowoczesne budownictwo sprzyja bytowaniu i rozmnażaniu się groźnego szkodnika sanitarnego, jakim jest mrówka faraona.

Klimat lokalny współczesnych miast stwarza niektórym gatunkom owadów krwio pijnych doskonałe warunki do przezimowania.

Skażenie powietrza ekshalatami przemysłowymi sprzyja powstawaniu chorób alergicznych, stąd coraz więcej nowych alergenów pojawia się np. w wylinkach i ekskrementach roztoczy przebywających w mieszkaniach.

Podgrzane wody zrzutowe elektrowni stwarzają zupełnie nowe warunki dla rozwoju wielu szkodliwych gospodarczo i sanitarnie bezkręgowców, np. owadów, mięczaków, powodując potencjalne zagrożenie, najczęściej poprzez przyspieszenie rozwoju i zwiększenie liczby pokoleń w ciągu roku.

Masowa turystyka, nie uwzględniająca ogniskowości chorób zakaźnych lub pasożytniczych, może ułatwiać wybuchy epidemii.

Zasadnicze niebezpieczeństwo antropopresji tkwi w dużej niewiadomej co do kierunku rozwoju sukcesji zespołów, zakłóconej jednokierunkową ingerencją człowieka w ekosystemy.